Supporting policy packages: the future of road pricing in the UK

Conference or Workshop Item

Kuhmo Nectar Conference and Summer School 2007
9-13 July 2007 - Faculty of Economics and Business
University of Urbino

Supporting Policy Packages: the future of road pricing in the UK?

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Abstract

Transport is already a large component of our economy and society. Historically, transport programmes were substantially about developing basic infrastructure networks. Now the emphasis is on the active management of systems and operating them to maximum advantage in the face of growing travel demand and capacity limitations. Combined developments in technology and the world economy have accelerated change to almost unpredictable levels. The change affects many areas and transport is not an exception. With new vehicle technologies, radical policies and the persistent growth in private and commercial vehicles, a new changing transport landscape is emerging.

One of these changes comes in the form of sustainable transport management - managing the demand of existing infrastructure networks. The role of demand management has been illustrated in many reports and papers and it seems that governments are becoming more aware of it. This paper focuses on one particular demand management policy that is often regarded as radical and generally unacceptable. Road pricing often gets delayed or abandoned due to controversy, disagreements, unanticipated problems and a whole host of other delaying factors. There are complex interactions in transport management - there is a need for cooperation between networks, stakeholders and different authorities.

Single measures that focus on 'sustainable transport' usually address a limited set of objectives and are not usually combined with other policy measures. When combined, it is sometimes unclear whether the multiple interactions between policy tools and implementation networks have been considered. An emerging case of implementation of a policy package in the UK is the support of road pricing initiatives combined with public transport improvements by the Transport Innovation Fund.

The paper will present a review of the UK road pricing situation along with key implementation factors that show firstly the importance of combining policy tools and secondly the necessity in creating and maintaining strong implementation networks.

Keywords: *Urban Road Pricing, National Road Pricing, Transport Innovation Fund, Transport Policy, Policy Packages*

1. A need for change

It has been said often, but apparently not often enough, that "*in transport things cannot go on as they have before*" (Glaister, 2001; Docherty and Shaw, 2003). A move from the 'predict and provide' transport policy to a demand-management, multi-modal, environmentally and socially sustainable approach was never expected to be easy. We don't like the idea of having to change. But with environmental pressures building and economic impacts of congestion worsening we might be forced to change.

Transport is already a large component of our economy and society - this can be seen in the relationship of transport with GDP. In the UK context this has been illustrated

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recently in the Eddington report (HMSO, 2006). Combined developments in technology and the world economy have accelerated change to almost unpredictable levels. The change affects many areas and transport is not an exception. With new vehicle technologies, radical policies and the persistent growth in private and commercial vehicles, a new changing transport landscape is emerging. The UK, together with most European countries, is transport intensive and dependent, and the trends are for further growth. The current UK government has made many steps in "*rejecting the myth of the great car economy*" (Docherty and Shaw, 2003) but the performance of their policies has been ambiguous. Car use continues to grow, car-reducing policies such as road pricing as well as alternative travel modes are not promoted adequately, and large-scale road building projects are slowly appearing again. This is not a viable model for the 21st century.

The car has evolved from an expensive luxury for a few to become an important tool for the everyday lives and employment of the majority of people, a status symbol and a hobby. Increased use of private vehicles has not only brought benefits. For many years congestion was little more than a localised problem. Today it has become endemic, not just for major cities but even in many rural regions. Associated with traffic congestion, are the related problems of air pollution, emissions of CO_2 and other greenhouse gases, together with more subtle lifestyle effects, such as contributing to less healthy lifestyles and transport poverty (Ieromonachou *et al*., 2006b). Other academics have reported thoroughly the unsustainability of current transport practices (Bannister, 2004; Whitelegg, 1993).

A wide range of policies have inherently been suggested to reduce the negative environmental externalities of transport and in particular the use of the private car. However, positive results appear to have a limited scale – whether they refer to the size of projects or their outcome. The problem lies to the fact that many of the suggested policies for improving the sustainability of transport focus on a narrow set of objectives. Big problems, such as global CO_2 emissions and the threat of global warming seem to dominate plans even for local projects. Undoubtedly transport will have an important role in the road to a global sustainable development. But long term trajectories need to be consistent with societal learning and policy implementation. Because of transport's relation with economic growth and the increase of negative impacts, in many cases the sustainability of transport is treated in isolation (Himanen *et al.*, 2004). Without underestimating the difficulties in analysing the last statement in fiscal and equity terms, what this paper proposes is not integration of all aspects of sustainability. The first step would be to integrate transport policies with the intent of combining measures, objectives and results.

The topic of merging policy measures into policy packages is not new. Conclusions from many studies (CORDIS, 1999; DfT, 2004; Feitelson, 2001) have supported the idea of implementing policy packages. Cases where this was seen as necessary included projects that generated tradeoffs by attempting to reduce externalities of other transport systems. For example, a set of restraint measures in a city centre could result in higher concentration of traffic in surrounding roads. A set of policies that includes different measures could have one policy addressing the negative impacts of another. For example, improvement in public transport systems in a city centre could help reduce the impact that access control or pricing policies would have on car drivers.

The purpose of this paper is to show the potential in successfully introducing sustainable development with the combination of policies into packages (policies reinforcing one another) and network dynamics (interactions, motivation, and learning). To illustrate this, the UK road pricing case is used as an example. A recent action by the UK government was the creation of the Transport Innovation Fund (DfT, 2004b; 2005) to support experiments with a package of policies including road pricing. Apart from examples on the implementation of schemes in the UK, the Transport Innovation Fund (TIF) as an approach for combining policies into packages is discussed.

2. Recent UK Transport Policy

To understand the reasons responsible for the introduction of road pricing schemes in Britain and the subsequent 'stalemate' that has been reached, a brief overview of recent transport policy issues is necessary.

The current Government, after the success in the 1997 general election, published the consultation document '*Developing an Integrated Transport Policy*' that had little impact as it basically reiterated the goals set by the previous administration. This was followed by the 1998 White Paper (DETR, 1998a) which was the first transport White Paper in 20 years. This document "*influenced policy and research and geared them towards the idea of an integrated transport system*" (Hine and Preston, 2003). Policy moved towards reducing car use and increasing alternatives, including public transport, cycling and walking.

New powers were proposed for local authorities to improve public transport services and encourage more sustainable modes of travel. The Greater London Authority Act and Transport Act (HMG, 1999; 2000) enacted the White Paper proposals, including provision for road user charging (RUC) and work-place parking levy (WPPL) schemes to be introduced by local authorities. Road user charging could have a role to play in reducing overall demand and the Royal Commission on Environmental Pollution (RCEP) concluded since 1994 (and also in 1997) that RUC could help reduce the dominance of motor traffic if local authorities were given powers to introduce RUC in their own areas.

A fundamental shift in transport policy was pledged in the pre-election campaign of 1997. But the problem is that the UK government backed out too easily from its original promises, as many academics agree (Docherty, 2003; Goodwin, 2003; Potter, 2001), and that it has fallen well short of the integrated transport aspirations expressed in the 1998 White Paper even by the time the 10 year Plan was issued in 2000. Right after the publication of the Transport Act 2000, fuel protests in September caused the removal of the fuel duty escalator, an important part of the transport policy until then. "All attempts to rebalance the cost of car use and public transport - a policy of successive Conservative and Labour governments for ten years - ceased from that point on" (Potter, 2004). The first instalment of *'Transport 2010: The 10-Year Plan for Transport'*, started the shift of the policy back to road construction, with around £60 billion allocated to roads over 10 years. The 'second' 10-Year Plan came in 2002 when the government published a progress report on the 10 Year Transport Plan. In this report it was admitted that congestion-cutting targets set out in the first plan were not going to be reached. Unforeseen economic growth and an unwillingness of local governments to implement congestion charging schemes were blamed for the failure to stay on target.

The 2004 White Paper on Transport, 'The Future of Transport: A Network for 2030', appeared as supporting a national road pricing scheme but did not set any firm time

limits or reassurances about the technological feasibility of such a scheme. A national scheme was 'reassuringly' set aside for the next 15 years, therefore removing it from a current political focus. However, at the same time as the White Paper was being published, another document emerged which constituted a comprehensive study on road pricing and how it could help make better use of the road capacity. The Road Pricing Feasibility Study (DfT, 2004) explained the reason for the time scale of the national road pricing scheme as being the need to develop the appropriate technology which was not expected to be available until at least 2014. Moreover, in its chapter six the report suggests that undertaking forms of road pricing on a more limited scale would improve knowledge on the effects and benefits of pricing. Support for these local schemes could come from the Transport Innovation Fund (TIF) which a following year report outlined (DfT, 2005). The TIF offered support for packages which combine demand management (including radical schemes like road pricing) with measures to promote modal shift and better bus services - the first TIF money would be made available from 2008/9.

3. Road Pricing

It was as early as the 1920's, when economists (Knight, 1924; Pigou, 1920) recognised road pricing as a simple way for taxing the external costs of transportation – congestion, accident risks, noise and emissions of pollutants (Maddison *et al.*, 1996). In the UK, the road pricing debate started in the Ministry of Transport Smeed report (1964), which identified the policy as a means of obtaining better value from roads. But a long time passed until the suggestions started to become a gradual reality.

With the exception of the Singapore scheme (1975), it was not until two decades later that politicians started to recognise road pricing as a potential funding source and travel demand management measure. Examples include the Norwegian urban toll schemes of the mid-eighties and early nineties, the Italian city centre pricing trials that evolved from zone access control and the two road user charging schemes that came into operation in Britain.

There are a variety of urban road pricing methods and sometimes a confusing variety of names are given to the schemes. It is therefore useful first to define the types of road pricing presented in this paper.

Cordon charging involves charging drivers crossing a cordon to enter a specific area – usually the city's central business district (CBD). Drivers pay a charge dependent on how many times the boundary is crossed. The fee can be levied using manual methods – either by manned toll booths or coin operated machines, as well as electronic tags – relatively simple read/write tags or smart card technology.

With one point controlling access to the Peninsula, the Durham scheme operates as a cordon scheme. Had it been implemented, the Edinburgh scheme would have operated a dual cordon scheme. Successful examples of cordon charging (toll rings) are found mainly in Norway where the policy has developed into a niche after most major cities adopted the measure (Ieromonachou *et al.*, 2006a).

Area charging applies to vehicles for accessing and travelling within a specified area by providing a license (paper permit) or charging (cameras, smart cards) to enter a certain defined area. It does not restrict how many journeys a license holder can make within the area and could be more refined as a congestion tackling tool. The London Congestion Charging scheme (2003) operates as area charging. Trondheim, a Norwegian scheme which ceased operation at the end of 2005, started off as a cordon

charging system. Seven years later, in 1998, it advanced to a 'proxy' area-based charging by dividing the initial area into several zones and introducing a charge for trips within zones (Ieromonachou *et al.*, 2006a).

Road Pricing Technology

A recent report by the Green Light Group (2006) lists three main technologies used in road pricing:

1. DSRC (Direct Short Range Communications): where roadside beacons are used to detect electronic tags on the windscreens of passing vehicles and charge the owner. This is the most common technology employed in the Norwegian toll-rings;
2. ANPR (Automatic Number Plate Recognition): using cameras to visually identify vehicles and read number plates as is the case in London; and,
3. REP (Remote Electronic Positioning): by using either satellites (GPS) or mobile phone systems (GSM) the system can track vehicles continuously and make distance based charging work. The German HGV charging system 'Toll Collect' is based on this technology. GPS systems permit charges to be varied by area, road type, congestion etc. There are some drawbacks such as a drop in reliability in densely built areas but technological solutions continue to develop solutions to problems. A REP system would need to have a back-up system in place and the Green Light Group (2006, p.4) suggests that the best solution would be to combine technologies: "general distance charging using REP, supported by a DSRC system for charging in those central urban areas where tall buildings make REP less reliable".

Another option, not mentioned by the group, could be *Distance-based charging*: A fee is charged according to the distance travelled. The Netherlands and Oregon have conducted trials on this system. Distance-based charging does not require GPS, but uses an on-board odometer charging unit.

3.1 Road Pricing in the UK

Road user charging had been proposed in the UK several times since the Smeed report (1964), but there were no serious attempts to practically introduce the policy, with exception a trial in the city of Cambridge in the early 1990s. For a number of reasons, most notably the lack of political support and not least because of the proposed "congestion" technology, the Cambridge scheme failed to progress beyond the field trial (Ison, 2004). Legislation for road pricing measures in the UK has been encouraged in recent years through the Transport White paper 'A New Deal for Transport: Better for Everyone' (DETR, 1998a) and the following daughter document – 'Breaking the Logjam' (DETR, 1998b). The 2000 Transport Act (HMG, 2000) contains powers for English and Welsh local authorities to introduce 'road user charging' schemes provided they form part of an integrated transport plan. The legislation allowing for the implementation of congestion charging in Central London was made available earlier under the Greater London Authority Act (HMG, 1999). In Scotland, the Integrated Transport Bill (TSO, 2000) included proposals for congestion charging. The Scottish Transport Act was approved in 2001 (TSO, 2001).

London

Central London had long established and serious traffic congestion. Over the years, a number of measures had been implemented to tackle the problem but none managed to do so effectively. The Congestion Charge scheme was introduced in February 2003,

following an intense planning and advertising campaign led by Mayor Ken Livingstone. A fee of £5 GBP (€7.3)[4] was initially[5] charged to motorists entering a central zone of a 5km radius between the hours of 7 a.m. and 6.30 p.m. on weekdays (TfL, 2003). The £5 charge was expected to deter 10-15% of vehicles entering the zone and reduce journey times by 25% but in practice reduced cars by around 20% and congestion by 30% compared with the last few weeks before charging. This better than expected impact upon traffic reduced the revenue generated from an expected £130m (€190m) to around £90m (€131m).

The initial charged area represented only 1.3% of the total Greater London area but around 200,000 vehicles were driving into the charging zone every day. From these, the charge applied to about 110,000. Exemptions included: 100% reduction to taxis, emergency vehicles, disabled badge holders as well as other groups and 90% reduction to residents of the zone (TfL, 2004). A network of video cameras in positions throughout the charging zone enforces the scheme. There are also a number of mobile units with cameras that patrol within the zone. Payment can be made to any of the 9,500 UK-wide Pay Points, at various petrol stations and shops throughout the UK. Payments can also be made by phone, SMS text, or the internet.

The traffic impact outside the congestion charging zone has, contrary to expectations, been minimal. To accommodate modal transfer, 300 additional buses, offering 11,000 places were added to the already extensive bus network of London increasing bus usage by more than 7%. Making radical improvements in bus services was one of the Mayor's ten priorities for transport in London (TfL, 2004). Plans for extension of the charging zone westwards were approved by the Mayor of London in 2005 (TfL, 2005) and became operational in February 2007.

Durham

Durham is in the North East of England and here the council had being trying to restrict city centre traffic to the 'Peninsula' area since 1949. This area has been designated as a UNESCO World Heritage Site[6] because of its religious and architectural significance and protecting it from traffic pollution was important.

For its size, the area had particularly acute traffic problems with Saddler Street, a single track road, the Peninsula's only access thoroughfare. Of the 3000 vehicles that entered the area each day prior to the scheme being adopted, 50% used the road as a mobile parking area thus contributing short-term to congestion by slowing down traffic. Congestion was high because of the sheer number of vehicles and pedestrians concentrated in a small street – around 13,000 pedestrians accessed the area each weekday and 17,000 on Saturdays (DCC, 2000). The situation in the area was untenable, threatening the viability of local businesses and damaging the appeal of the Durham Peninsula as a World Heritage Site.

Various measures had been proposed and tried over some 20 years, but failed to solve the problem. With the ineffectiveness of the conventional parking and traffic management scheme, 1997 saw the creation of Durham's Transport Steering Group. This consisted of members of the City and County Council members and various representatives of the major stakeholders on the Peninsula, businesses and other establishments as well as the police and the Chamber of Trade. The agreed aim for the

4 Exchange rate at time of writing £1 GBP ≈ €1.46 Euro.

5 The charge was increased to £8 (€11.7) in July 2005.

6 There are 26 World Heritage Sites in the UK. For more details visit: http://www.culture.gov.uk/ historic_ environment/World_ Heritage.htm

Peninsula was to significantly reduce the pedestrian and vehicular conflict by removing a substantial proportion of the existing traffic through a road user charge. A key part of introducing the congestion charge was the provision of alternative means of access to the Peninsula, and discussions with public transport users resulted in the launch of a new minibus service, the 'Cathedral Bus', that began operating some two months before the congestion charge was introduced (DCC, 2002).

The Durham Road Access Charge Scheme began operating in October 2002, the first to take advantage of road user charging powers granted in the Transport Act 2000 (HMG, 2000). Motorists pay a £2 (€2.95) charge to exit the area on Monday to Saturday between 10am and 4pm (DCC, 2003). An exit charge was preferred as it allows free flow of vehicles into the area, preventing traffic queues back to a nearby major road. The exit is controlled during the charging period by an automatic rising bollard that is dropped upon payment (the machine accepts coins and cards, while annual permit holders can lower the bollard by using a transponder).

It was estimated before the implementation that there would be a 50% reduction in vehicle access to the area. For the remaining traffic, a very generous 70% would have permits and 30% would be liable to pay. The first evaluation of the scheme (DCC, 2003) showed the reduction of vehicles to be around 85% so the permit allocation, despite the fact that it seemed generous, has not affected the scheme's traffic reduction impact.

Edinburgh

Edinburgh has been enjoying continued economic growth and success in recent years. The Scottish capital city, like Durham, is a World Heritage site, a major financial and commercial centre and a major generator of economic activity for the region as well as the country. Growth in car ownership and use has caused traffic levels in certain roads to increase by up to 60% in the last 20 years, which in turn has caused congestion, parking problems and air pollution at key city locations (Edinburgh Council, 2003).

Edinburgh Council, proposed to introduce a congestion charging scheme to directly reduce the number of vehicles using Edinburgh's road network whilst at the same time raising revenue for public transport improvements. Without the charging scheme, transport models (MVA, 2000a; 2000b) predicted traffic level increases of around 30% by 2021, as well as increased time lost due to congestion. An initial consultation, conducted with residents and businesses in Edinburgh showed at the time the majority of respondents in favour of a road user charging scheme (Arthur Andersen, 2000).

If implemented, the proposed scheme would have charges levied at roads crossing two cordon lines: an inner cordon defined by the boundaries of the centre of Edinburgh and an outer cordon inside the city bypass. A daily, one-off charge of £2 would be collected from vehicles travelling inbound the cordons and only during the charging period. The two cordons would operate from Monday to Friday with slightly different schedules, with the inner one from 7 am until 6.30 pm, while the outer cordon would operate in peak times between 7 am until 10 am and between 4 pm until 6.30 pm. The scheme would operate with cameras so that no toll barriers or charge points would add to delays. Payment of the charge would be made available through a number of methods that would include: pay-points at shops, the Internet, a call centre and mobile phones.

The Council had committed to spending all net revenue raised by the charging scheme on transport projects and services, in addition to the existing public sources of transport funding. Prior to any charging scheme being introduced, there would be a £100 million

up-front investment to improve the city and regional public transport network. Over £100 million was already estimated as public sector funding for projects within Edinburgh and southeast Scotland (tie, 2003).

The Referendum

The Council had claimed throughout its campaign that their first priority was to make the scheme fair and socially inclusive. On February 2005, Edinburgh residents were asked to vote for or against the Council's transport proposals which included plans for the congestion charge and a package of planned transport improvements funded from the charging revenue. From a turnout of around 62 per cent, 75 per cent (133,678 voters) were against the proposals for the charging scheme. Voters explained that the Council failed to convince them that the proposals for the charge were sufficiently equitable and that the scheme would have hurt the local economy as well as pushing traffic into the residential areas of the city (BBC, 2005; Reuters, 2005). Supporters of the road charging scheme accused the Council of "*an excess of democratic zeal*" and, that the referendum had condemned the plans beforehand. A range of issues was responsible for the way Edinburgh's residents voted in the referendum, but most importantly people's perceptions on issues of fairness and taxation (Saunders, 2005). Edinburgh did not succeed in creating the necessary alliances between the adjoining authorities in the public sector and failed to secure a consensus among the political parties before any decisions were made (Ieromonachou *et al.*, 2006c). Derek Turner, one of the designers of the successful London charging scheme, pointed out that Edinburgh should have avoided the referendum and brought as an example the Stockholm compromise where the local authority agreed for the public to vote on a charging scheme after it operates for a year.

4. Key implementation factors

Road pricing is a complex market based instrument and its implementation does not depend on a single issue. This section details a number of these critical factors relating to the implementation of road pricing. The factors cannot be considered complete as each scheme can bring in its own complexity, but they represent areas of concern identified in previous research by the author (Ieromonachou, 2005). Other studies have identified important issues concerning the implementation of road pricing based on scenarios (Glaister and Graham, 2005) and game theory (Levinson, 2005) or implementation steps (Ison and Rye, 2005). Some relate to the factors presented in this paper, but do not concentrate on a network based analysis. Below, a brief analysis explains each of the six factors.

Partner-Actor Networks

Around any policy measure are networks of affected groups – businesses, interest groups, neighbouring local authorities and local residents. These seek to influence or be part of the policy development process. The active involvement of such groups in policy development and implementation is seen as essential (Gillingwater and Ison, 2003). Glaister et al., (1998, p10) emphasised that:

"...anyone with an interest in transport policy who wants to exercise an effective influence in that process needs to understand who the actors are, how they relate to one another, what powers they exercise and what constraints they face".

In this paper, a categorisation of such 'stakeholders'[7] has been adopted, developed in earlier work by the author and based on innovation management studies (Hoogma *et al.*, 2002; Geels, 2002; Potter, 1999; Rothwell, 1992; Schot and Rip, 1996). A distinction has been made between two groups: (a) the partners, those actively involved in the planning, implementation and operation of a scheme, and (b) the actors, users and other groups that were affected by the measure and may have been indirectly involved in the decision-making process. In almost all cases, the leading Partner (or project manager) has been the Local Authorities, represented either by a strong champion or group. The first stage of the analysis is to identify the Partner-Actor network for developing and implementing a policy initiative. A network of partners and actors was apparent in all the investigated cases, but the level of involvement of each group differed in each project. All cases required a wide partner network to implement their respective schemes and this involved a complex project planning system. Even in the case of London where the key partner appears to be TfL headed by the Mayor, there were a large number of groups working for this and they were all grouped under the aegis of TfL.[8] The importance of particular relationships in each Partner-Actor network varied with the institutional context in which they were placed. It cannot be generically said that a certain set of links were more important than others. An important aspect of the analysis is that this context (regional context) is mapped and from this an understanding of key relationships emerges.

The UK schemes started with no user familiarity with road user charges and also sought to cut traffic flows. This combination required a wider partner/actor network and thus the project planning system and network had to be largely created anew. Durham did try initially to introduce Access Control using a very restricted partner network but that failed. Later, Durham identified and empowered a wide range of community stakeholders, developing relationships with them and drawing them in to become partners to the scheme. The way in which the County Council also promoted actors in the scheme into partners was probably one of the most interesting and important factors. The scheme therefore was protected by a network of partners and actors that wanted a solution of the problem that existed in the area. As it would be expected, the London Congestion Charging scheme required a great number of stakeholders to be involved in its planning, implementation and management operations. It appears that not many seemed involved due to the fact that the Mayor and Transport for London (TfL) combined the majority of the most essential partners that invested in the scheme. London had all vital partners grouped under the aegis of one 'lead player', TfL although the London Boroughs remained independent and some have been the focus of opposition. Despite a niche being created in urban road pricing policies by the London and Durham schemes, the Edinburgh project failed to get past the design stage. The majority of the voters in Edinburgh failed to accept the importance of the policy in reducing the use of private vehicles in the city and the potential benefits it would have brought to their overall mobility. The politicians were not close to the population to understand their needs.

7 The term 'stakeholder' is used here to mean any affected group. More restricted meanings are sometimes used (e.g. by TfL to mean only "corporate" interested bodies.)

8 Boroughs are not part if TfL but are highway authority for much of the London road network; furthermore, the Underground remained under Government control until the PPP was finalised.

Project champion

Where projects involve complex systems of partners and actors, the management process needs a mechanism to provide focus and drive. This is particularly so for innovative projects involving the creation of new networks. This role is one that can be filled by project champions - charismatic individuals that spearhead projects. Support of politicians is vital to the introduction of any road-pricing scheme whether a charismatic project champion exists or not. The project champion emerges as a critical part of the process of getting the charging system into place.

All schemes examined had some type of champion figure or change agent but this varied, with the role being an individual (London) or community group (Durham). In some places (like London) the champions held special places (such as a government office) and their personal motivation could have linked to motives beyond the scope of transport policy. By contrast, in Edinburgh "no independent champion of the scheme, political or not political, emerged to build support" (Saunders, 2005).

Expectations – Motivations

It is interesting to find how the expectations of different partners and actors gradually become aligned and, for this to happen, a shift in expectations would have occurred. The next stage in the analysis is to explore the motivations and the extent to which the different expectations of partners and actors come together. Many of the parties taking part bring their own notions, values and beliefs with them, which may be summarised as their motivations. When examined, motivations help explain why each group became involved in a road pricing scheme in the first place and the amount of commitment they have towards it. Sometimes motivations are very obvious and in some cases they develop or evolve during the various scheme phases. Motivations are intrinsically linked to the expected outcome of the scheme. These expectations of partners and actors are useful to analyse for many reasons. A real danger sign is where a scheme involves partner and actors who have very different expectations and conflicting motivations.

It is of note that behind the transport reasons for the road pricing schemes referred to in this paper there were deeper motivations than simply transport policy. For example, protection of historical buildings was of great importance in Durham and Edinburgh. In London the main motivation was the economic cost of congestion and the direct transport benefits. Tapping into the core motivation of key actor groups is therefore important. In Durham, groups that would otherwise be seen as actors in the scheme were brought in the network as partners. They were given responsibilities and thus were able to voice their concerns and have more control over working through their motivations and exploring expectations.

Protection measures

These are complementary actions benefiting users to support road pricing policies. The author in a previous project (Ieromonachou, 2005) has categorised protection measures into two forms: (a) *Enhancement Protection*, which are actions that enhance the effect of road pricing (like the provision of extra public transport capacity to facilitate modal shift from car, subsidies to reduce public transport ticket prices, reallocating road space for pedestrians and bicycles etc.); (b) *Compensation Protection*, where there are full or part exemptions from charges for certain groups of users, for social or transport policy reasons. Typically the latter include buses, taxis, disabled drivers and local residents.

Both types of protection measures are particularly needed for innovative or unfamiliar policy measures and are closely related to the level of acceptance achieved (considered

below). Enhancement Protection measures featured strongly in the London and Durham schemes. These were therefore an inherent part of both schemes. A major part of enhancement protection in London was enhancing public transport services and the London experience shows how much can be accomplished in a relatively short amount of time and with relatively low capital (i.e. extra 300 buses). Durham also introduced the Cathedral bus service to provide alternative access to the charging area.

Network Learning

Successful development of a specific policy niche depends on the local level of innovation processes and stakeholders behaviour. If the innovations (in this case road pricing policies) are successful, then the niche they create will become known and may be adopted more widely. Niche development can be evaluated by the level of learning and the level of institutional embedding. Hoogma et al. (2002, p.28) appreciate the learning that occurs through a range of processes of articulating "relevant technology, market and other properties" but enhance this notion by suggesting that a second-order learning is required for niche development to result in a regime shift. This form of learning will involve a co-evolutionary learning (Wynne, 1995) that will draw in the partners and actors involved in the scheme but also third parties like governments that can help in the institutional and societal embedding. Learning processes need to extend beyond the immediate local network of stakeholders. This is where the wider issue arises of what contributes to acceptance of a policy measure.

Each of the cities referred to in the paper used incremental processes but in different ways. All the successful schemes have used an incremental approach with flexibility to experiment and adapt. As the process unfolds, many of the barriers would be (or in effect be seen) as less dramatic. Radical policies require a relatively un-complicated start and a pre-defined 'test' phase that would allow for problems like political and public acceptability to gradually normalise. Even London, a case praised for its "courage and rapid execution" (Grush, 2005), used incremental processes. This refers firstly to the initial choice of ANPR (automated number plate recognition) as enforcement technology which was expensive but it constituted tested technology that could easily and quickly be put in place in time for the proposed start date. After the scheme was established, experiments started with GPS (global positioning system). An incremental evolution in the technology path could easily follow a successful scheme. Secondly, a relatively small area was chosen for the initial charging zone for reasons of cost and technical feasibility. An incremental approach has emerged with the expansions of the zone in 2007 – which builds on existing experience and network learning.

An important part of learning by the network of partners and actors involves understanding user needs and attitudes towards policy measures such as road pricing. The actor/partner network's assessment of user attitudes has, of course, already influenced them through the factors of expectations/motivations and has been reflected in the design of protection measures. However, this is indirect and therefore a separate category is viewed as necessary taking the user perspective of the policy.

User Learning/Acceptance

A number of studies took place in order to establish the social aspects and acceptability of transport pricing policies in the UK (Jones, 1998; Preston et al, 2000; Rajé, 2003). In the UK, Ison (2000) found that approximately 80% of surveyed people viewed urban road pricing as being publicly unacceptable. This point was supported by

findings from an RAC study (2002) that 83% of motorists would find it very difficult to adjust to a lifestyle without the car. The same report argues that most would find road tolls acceptable if there were equivalent reductions in fuel duty or as part of a package for better roads, public transport and traffic management. The *TransPrice* project (1999) concluded that the lack of political willingness to implement charging measures stems from the electorate's perceived low acceptability for such measures. Other studies showed the acceptability of road pricing depends upon perceived benefits and the justification given for the development of such a programme in the selected area (Jones, 1998; Schade & Schlag 2003). This links in to the motivation/expectation and protection measures. It is clearly important to take into consideration both in the design and implementation of the scheme the views that arise within the general public. Acceptability needs to be considered seriously by implementers and government officials. The public still has little knowledge of the possibilities of pricing policies as solutions to traffic congestion over other policies.

Incremental approaches permit learning and enhance understanding and acceptance. In the UK there was little experience of road charges or even city centre access control zones, which meant that the London and Durham schemes involved something entirely new. In all cases, acceptance of road pricing required a widespread acceptance that it was needed to address an accepted problem. In London and Durham it was congestion; it is essential that the charging scheme is seen as a solution to an accepted problem. In Edinburgh, people that voted against the proposed scheme considered that congestion was not a big problem.

There are many difficulties when introducing a radical transport scheme like road user charging. There are always a number of technical difficulties but however complex such issues may be, they rarely compare with the social barriers linked with such a process (Langmyhr, 1997). Dealing with all the diverse opinions of the different stakeholders, users or affected groups and most importantly finding the way to win the support of the majority of the public can be made easier if the project is explained and the benefits of such a venture are clearly identified. Improvements to transport (private and public) prior to the charging would benefit the image of the scheme as performing well.

In practice, many politicians see the London experience as exceptional and identify more closely with the politically damaging outcomes in Edinburgh. The issue of user learning and acceptance, and the need for implementation processes that facilitate this, is therefore as important as ever. The success of both the London scheme and Ken Livingstone's re-election revived the Government's interest in road pricing. This led to the rapid development of proposals for a national congestion charging scheme, preceded by local trials financed under the Transport Innovation Fund (TIF).

5. Support for policy packages – the Transport Innovation Fund

The 2004 transport White Paper (DfT, 2004a) announced the intention of creating a Transport Innovation Fund as support to local authorities interested in using demand management to reduce traffic congestion. The White Paper explained the role of policies in managing demand but warned that, on their own, such policies will not be sufficient to prevent congestion spreading for longer periods of the day and for more road users. Congestion problems need integrated solutions from the local authorities and the TIF will help putting in place policy packages that combine effective radical schemes with measures that promote modal shift and better public transport. Guidance

for the TIF was outlined in another report from the Department for Transport in 2005. The fund is looking in particular to support:

- Smarter, innovative local transport packages that combine demand management measures such as road pricing with modal shift measures such as better bus services;
- Innovative mechanisms to raise new funds;
- Schemes that will be beneficial to the national productivity.

6. Moving towards change

Economic growth has put a tremendous strain on existing transport networks in recent years. Consequently, and also for broader environmental and financial reasons, transport issues have risen sharply on the political agenda of most countries, especially in areas where population density is the highest. Congestion is widely acknowledged as becoming the critical issue regarding surface transport especially in urban areas (DfT, 2004a; EU, 2003). The UK and other western European countries are gradually learning that economic growth and traffic congestion cannot be reconciled by simply building new road infrastructure, as car traffic expands to fill up new road capacity. Twentieth-century transportation programs were substantially focused on developing basic infrastructure networks. Now the emphasis is on the active management of this system and operating it to maximum advantage (on a continuing sustainable basis.) Today's economy and quality of life are critically dependent on managing the basic network in the face of growing travel demand and capacity limitations. The need for a consistent and integrated approach to management and operations results from a series of drivers, including:

- Growing and Changing Demands: Urban areas are facing a high growth in travel over the next 20 years.
- Unsustainable trends: The transport sector accounts for 36% of all energy used in the UK. This includes all modes of travel but it is mainly dominated by fuel use for land transport.
- Increased User Expectations: The service orientation of the economy is generating customer expectations for a broader range of system performance and service options.
- Constraints on Traditional Approaches: The financial and environmental constraints on new facility construction continue to increase;
- The introduction of new communication and control technology now provides the basis for intelligent transportation systems. These can support a wide range of user services based on operational and management features.

One of the messages of this paper is that solutions to problems caused by transportation systems are very much contextual issues. Most places in the UK and especially rural areas do not experience London's levels of traffic. Findings from the cases show that recognition of the problem is vital as well as incremental implementation. Avoiding this incremental implementation and jumping straight to a national scheme in 10 to 15 years does not register as good practice.

Implementation requires work from system builders and project champions. The overall process involves the change of users' attitudes and institutional structures and requires, apart from time, planning. The research conducted, which this paper forms a part, showed that users' response to proposed measures plays an important role in the

final outcome of the project. In many cases, management (partners) were the main driving force for introducing a measure but users and other groups (actors) had an active role in the shaping of a measure. However, despite the efforts of local authorities and their networks, it remains crucial for the central government to remain active on the measure. Glaister *et al*. (1998) judge that: "*Transport policy is not a technical issue which can be debated and decided between experts. It has been and remains a political decision*".

The paper also suggests it would be better to continue to provide a back-up to local schemes first, so there is a spread of the urban road pricing niche and gradual acceptance of the policy at the local level. Combined with tolled roads and charging in urban centres the transition would become easier. The announcement in June 2005 for a National Road Pricing Scheme combined with the 2004 White Paper on transport (DfT, 2004b), marks a shift in the approach to local road pricing measures. The previous policy was to provide enabling powers for local authorities to introduce RUC (DETR 1998a, 1998b). The new policy is for a radical, nationwide scheme. There is a danger that this will not permit a gradual adaptation, learning and user understanding that this paper has shown to be so crucial for the successful implementation of local schemes. The paper suggests that phased measures (in the form of local urban schemes) would be crucial as 'stepping stones' towards the countrywide solution, a view supported in the announcement of the Transport Innovation Fund to support such ventures.

This review of UK experience indicates that the key to this is the decision making and planning part of the overall implementation process. The role of transport professionals is not just implementation in the old sense – i.e. building roads – but implementation in a new sense of being fully involved in decision making and planning. Most professionals know this, but perhaps do not appreciate the different nature of the tasks involved and the skills needed. Part of this new role is for them to become more involved in the upstream process, the process prior to the implementation of measures.

From the road pricing cases referred to in this paper, some key issues seem recurring. These key issues concern: the importance of consensus in the level of congestion or perception of congestion; the choice of scheme; the need for transparency in the project implementation and management as well as the use of revenue; the importance of local politics and network alliances in attaining acceptance for the scheme. The brief presentation of these issues cannot be considered a recipe for success as it cannot form an exhaustive discussion on the subject. To aid understanding, the issues have been grouped under six factors that appear to capture the basic structure of a road pricing implementation process. Each factor when analysed separately would expand to a new list of key points crucial to the upstream process. In summary, possible key factors to consider are:

- Managing the partner network for implementing a road pricing scheme can be a complex task. This can involve new skills and tasks than are normally involved in more traditional local transport measures;
- Radical policies need a champion to spearhead their implementation, but champions can take many forms;
- Identifying and understanding core motivations of actors that the measure could support - these may only be indirectly related to transport (e.g. cultural image, economic impacts, prestige, well being etc.);

- Policies can reinforce one another. Protection measures to support the road pricing policies are needed most where demand management was involved and where tradeoffs between policies can endanger their efficiency and acceptability.
- Extending beyond the partner network to the actor network that provides support for a road pricing scheme. Understanding, informing and empowering actor groups is important for winning widespread acceptability;
- Learning occurs at many levels and in many ways. However, it is important for a new scheme to build on existing processes and measures to promote learning.

7. Conclusion

The analysis framework described in this paper was not structured only for the UK cases. It was based on research in three European countries (Ieromonachou, 2005) and it is likely that it could be applicable if considered elsewhere. It also seems feasible that the relevance of road pricing would be enhanced as experience in its use, especially when introduced in policy packages with other measures, builds up. The TIF schemes, made known a year after the plans for an eventual national congestion charge in the UK, could possibly provide stepping stones to such learning. The formation of local policy niches would help in building up people's (both partners and actors) knowledge, experience and understanding of road pricing. But it is also important to contain all the important elements for learning that have been vital in previous successful schemes.

Combining policies into packages is necessary considering the interactions between different measures. As seen from the case studies in this paper, policies reinforce each other and offer protection such as for example enhancing public transport before introducing restraint measures. This protection stems from the alignment of goals (expectations-motivations) of partners and actors and from the action one policy can have on the negative impacts of another.

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